

### Abstract

A base material made of C-faced sapphire single crystal is set on a susceptor installed in a reactor arranged horizontally. Then, a trimethyl-aluminum and an ammonia are introduced as raw material gases into the reactor and supplied onto the substrate, to form an AlN film. In this case, the temperature of the base material is set to 1100°C or over, and the ratio (V raw material gas/III raw material gas) is set to 800 or below, and the forming pressure is set within a range of 7-17 Torr. As a result, the crystallinity of the AlN film is developed to 90 arcsec or below in FWHM of X-ray rocking curve, and the surface flatness of the AlN film is developed to 20Å or below. Therefore, a substrate composed of the base material and the AlN film is preferably usable for an acoustic surface wave device, and if the substrate is employed, the deviation from the theoretical propagation velocity is set to 1.5m/sec or below.